PURIFICATION AND CRYSTALLIZATION OF A RED-LIGHT PHOTORECEPTOR, Mark J. Banks, Wesley B. Ozarowski, Chris M. Meissner, Emina A. Stojković*, Keith Moffat[$], Northeastern Illinois University, Department of Biology, Chicago, IL, 60625, [$]The University of Chicago, Institute for Biophysical Dynamics, Chicago, IL, 60637,e-stojkovic@neiu.edu

Photoreceptors are chromoproteins that sense and respond to light. They are signaling proteins, often part of large signal transduction pathways that play key roles in essential processes to cell division and survival. Molecular principles that initiate and regulate light-regulated signal transduction are not well understood at the atomic level. X-ray crystallography can be used to reveal structural changes that occur in the protein at the atomic level if the protein is in crystal form.

Phytochromes are a family of red-light photoreceptors found in bacterial, fungal and plant kingdoms. They are unique in their ability to reversibly photoisomerize between two forms, Pr and Pfr, absorbing red and far-red light, respectively. Previously, the photosensory core (PC) of RpBphP2 (P2), a bacteriophytochrome from *Rhodopseudomonas palustris,* was successfully purified and crystallized in dark conditions, enabling structural analysis of the protein's Pr state.

We purified and crystallized the PC of P2 when the protein was handled in the presence of white light with the ultimate goal of solving P2 structure in the Pfr state. Purified P2 appeared as a single band on the silver-stained protein gels and readily crystallized by hanging-drop vapor diffusion at 16ºC. Crystals of P2 PC were stable for six months following brief but intense exposure to white light and were of comparable diffraction quality to P2 PC crystals obtained in dark conditions, or under green safety lights.

Crystallographic data obtained from P2 PC crystals in the Pr and/or Pfr states will inform the design of specific point mutations in the protein's sequence that will help in determining critical atomic interactions that take place during the photoactivity of P2.

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